

ADDENDUM TO RISK-BASED CORRECTIVE ACTION REPORT

Boeing Tract 1, St. Louis, Missouri

September 2004

Introduction and Objective

The Risk-Based Corrective Action Report for the Boeing Tract 1 facility in St. Louis, Missouri dated September 2004 was prepared under the assumption that groundwater at the Boeing facility and in the immediate vicinity is not currently being used as a source for domestic use, and will not be used for domestic purposes in the future. This is a key assumption that is applicable to all of the exposure units at the Boeing facility.

The objective of this addendum is to provide documentation to support the above assumption. The following text was developed following the draft criteria developed by the Groundwater Classification Subgroup to be utilized under the Missouri Risk-Based Corrective Action (MRBCA) Program.

GROUNDWATER CLASSIFICATION

SITE: Boeing Tract 1, St. Louis, Missouri

Analysis of Current Groundwater Use

Identify Existing Wells: Eight private wells were identified within a 3-mile radius of the FUSRAP North County Site consisting of SLAPS and the Hazelwood Interim Storage Site (HISS) (USACE, 2003). Well depths range from 35 feet to 400 feet and none are currently used as a drinking water source. Four are irrigation wells and one is an industrial supply well. The three other wells had been used for domestic purposes, but were capped and abandoned in 1962, 1968, and 1979 (BNI, 1992). Most of these wells were installed into fractured bedrock for better yields than can be obtained from the shallow unconsolidated formation (USACE, 2003). One well was identified within one mile of the Boeing facility (Golder and Associates, 2003). This well was installed in 1968 to a depth of 44 feet as an observation well. The well is located approximately 0.5 mile southwest of the Boeing facility in the area of the current westward airport expansion (MACTEC, 2004).

Reasonable Probability of Impact by Site COCs:

Finding: There is no probability of impact to the wells identified above since (i) the site COCs plume has been defined on-site, and (ii) the groundwater flow direction at the site is to the southeast and the nearest well is an observation well about 0.5 mile to the southwest of the Boeing facility.

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Analysis of Future Groundwater Use

Identify Groundwater Zones:

Zone 1: Shallow Groundwater – extends from ground surface to the top of the organic silt layer that overlies the dense clay. Groundwater in this zone typically extends from about 4 to 20 feet below ground surface (bgs).

Zone 2: Deep Groundwater – includes the low permeability clay (aquiclude) that separates the deep and shallow groundwater zones and the underlying silty clay and basal sands and gravel above the bedrock. Groundwater in this zone is present from about 20 to 80 feet bgs; however, much of this interval is low permeability clay.

Zone 3: Limestone Bedrock – includes the Ste. Genevieve and St. Louis limestones that underlie the unconsolidated materials. Groundwater in this zone is typically deeper than 80 feet bgs.

See RFI for more detailed description of the geology and hydrology (MACTEC, 2004).

Groundwater Zone 1:

Institutional Control Sufficient to Eliminate Reasonable Probability of Future Use?
Establishment of Activity Use Limitations (AULs) are planned for the site to prevent both groundwater use and residential property use. The specifics of the AULs will be worked out between Boeing, the Missouri Department of Natural Resources (MDNR), and affected property owners.

Suitable for Use?

Based on the Draft MRBCA Process document, the Groundwater Subgroup has specified that both of the following criteria must be met for a groundwater zone to be considered adequate to serve as a potential source of domestic water supply: (i) groundwater zones capable of producing a minimum of ¼-gallon per minute or 360 gallons per day on a sustained basis, and (ii) groundwater zones containing less than 10,000 mg/L total dissolved solids (TDS).

- **Yield:** Yes, based on the results of the two short-term pump tests performed on monitoring well MW-7S as part of the RFI in November 2001 (1.2 liters per minute with only 1.8 feet drawdown during a 7.1-hour test); however, lower yields are expected across the site as a whole based on well development, purging, and sampling experience (MACTEC, 2004).
- **Natural Quality:** Yes, although no TDS data has been collected, a large amount of conductivity data was collected as part of the RFI, which can be used to calculate TDS content. Based on the conductivity data collected, the TDS content will be less than 10,000 mg/L.

Only Source?

No. The primary source of drinking water in the St. Louis area is surface water from the Mississippi, Missouri, and Meramec Rivers. Aquifers also exist in both the bedrock and unconsolidated deposits along the Mississippi and Missouri Rivers; however, bedrock aquifers are generally not utilized for drinking water purposes in the St. Louis area. At its closest point, the Missouri River is about three miles to the northwest of the site.

Reasonable Probability of Future Use?

- Alternative sources of water supply: Yes, municipal supply.
- Institutional controls: Yes, Alternative Use Limitations are planned.
- Urban development considerations: No, the site and vicinity are highly developed with commercial/industrial facilities primarily associated with the adjacent St. Louis Lambert International Airport. Future development would likely consist of renovations and redevelopment for similar purposes.
- Aquifer capacity limitations based on multiple user considerations: Yes, if the shallow groundwater zone was considered for water supply purposes, it is unlikely that it could provide the quantity of water needed to support the commercial/industrial facilities typical of this area. Also, considering the presence of an adequate municipal supply, it is not likely that this groundwater zone would be considered.

Reasonable Probability of Impact by Site COCs? Yes, the shallow groundwater zone has been impacted at the site.

Finding for Zone 1: The groundwater use pathway (domestic consumption) is not complete at the site, nor within three miles of the site based on previous investigations (see above). The shallow groundwater zone is not a probable source of future water supply, based on alternative sources and planned Alternative Use Limitations.

Groundwater Zone 2:

Institutional Control Sufficient to Eliminate Reasonable Probability of Future Use?

Establishment of AULs are planned for the site to prevent both groundwater use and residential property use. The specifics of the AULs will be worked out between Boeing, the MDNR, and affected property owners.

Suitable for Use?

- Yield: Yes, based on the hydraulic conductivities calculated from Slug Tests performed on the deep groundwater zone at the adjacent SLAPS (MACTEC, 2004).
- Natural Quality: Yes, although no TDS data has been collected, a large amount of conductivity data was collected as part of the RFI, which can be used to calculate TDS content. Based on the conductivity data collected, the TDS content will be less than 10,000 mg/L.

Only Source? No. The primary source of drinking water in the St. Louis area is surface water from the Mississippi, Missouri, and Meramec Rivers. Aquifers also exist in both the bedrock and unconsolidated deposits along the Mississippi and Missouri Rivers; however, bedrock aquifers are generally not utilized for drinking water purposes in the St. Louis area. At its closest point, the Missouri River is about three miles to the northwest of the site.

Reasonable Probability of Future Use?

- Alternative sources of water supply: Yes, municipal supply.
- Institutional controls: Yes, Alternative Use Limitations are planned.
- Urban development considerations: No, the site and vicinity are highly developed with commercial/industrial facilities primarily associated with the adjacent St. Louis Lambert International Airport. Future development would likely consist of renovations and redevelopment for similar purposes.
- Aquifer capacity limitations based on multiple user considerations: Yes, if the deep groundwater zone was considered for water supply purposes, it is unlikely that it could provide the quantity of water needed to support the commercial/industrial facilities typical of this area. Also, considering the presence of an adequate municipal supply, it is not likely that this groundwater zone would be considered.

Reasonable Probability of Impact by Site COCs? Yes, the deep groundwater zone has been impacted at the site.

Finding for Zone 2: The groundwater use pathway (domestic consumption) is not complete at the site, nor within three miles of the site based on previous investigations (see above). The deep groundwater zone is not a probable source of future water supply, based on alternative sources and planned Alternative Use Limitations.

Groundwater Zone 3:

Institutional Control Sufficient to Eliminate Reasonable Probability of Future Use?

Establishment of AULs are planned for the site to prevent both groundwater use and residential property use. The specifics of the AULs will be worked out between Boeing, the MDNR, and affected property owners.

Suitable for Use?

- Yield: Yes, based on the average hydraulic conductivity calculated from field permeability (packer) tests performed on the bedrock groundwater zone at the adjacent SLAPS (MACTEC, 2004).
- Natural Quality: Yes. No TDS or conductivity data has been collected from the bedrock groundwater zone at the site. However, Miller includes the Ste. Genevieve and St. Louis Formations (deep groundwater zone) in his description of the Group 1 (Post Maquoketa) Aquifers (Miller et al., 1974). Miller describes the water from the Group 1 aquifers as having a TDS content ranging from 246 to 6,880 mg/L (MACTEC, 2004), which is of sufficient quality for domestic use. He goes on to say that higher TDS content water from the Group 1 aquifers is present in areas north and northwest of the City of St. Louis.

Only Source? No. The primary source of drinking water in the St. Louis area is surface water from the Mississippi, Missouri, and Meramec Rivers. Aquifers also exist in both the bedrock and unconsolidated deposits along the Mississippi and Missouri Rivers; however, bedrock aquifers are generally not utilized for drinking water purposes in the St. Louis area. At its closest point, the Missouri River is about three miles to the northwest of the site.

Reasonable Probability of Future Use?

- Alternative sources of water supply: Yes, municipal supply.
- Institutional controls: Yes, Alternative Use Limitations are planned.
- Urban development considerations: No, the site and vicinity are highly developed with commercial/industrial facilities primarily associated with the adjacent St. Louis Lambert International Airport. Future development would likely consist of renovations and redevelopment for similar purposes.
- Aquifer capacity limitations based on multiple user considerations: Yes, if the bedrock groundwater zone was considered for water supply purposes, it is unlikely that it could provide the quantity of water needed to support the commercial/industrial facilities typical of this area, since it is considered massive with limited development of secondary porosity in the site area (MACTEC, 2004).

Also, considering the presence of an adequate municipal supply, it is not likely that this groundwater zone would be considered.

Reasonable Probability of Impact by Site COCs? No, based on the degree and extent and locations of impact identified in the deep groundwater zone (MACTEC, 2004), it is unlikely that the underlying bedrock groundwater zone has been impacted.

Finding for Zone 3: The groundwater use pathway (domestic consumption) is not complete at the site, nor within three miles of the site based on previous investigations (see above). The bedrock groundwater zone is not a probable source of future water supply, based on alternative sources and planned Alternative Use Limitations.

REFERENCES:

Bectel National, Incorporated (BNI). January 1992. Remedial Investigation Report for the St. Louis Site, DOE/OR/21949-280, St. Louis, Missouri.

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Miller, D.E., L.F. Emmett, J. Skelton, H.G. Jeffery, and J.H. Barks. 1974. Water Resources of the St. Louis Area, Missouri. Prepared under a cooperative agreement between USGS and Missouri Geological Survey and Water Resources, Library of Congress Card Catalog No. 74-620072.

U.S. Army Corps of Engineers (USACE). 2003. Final Feasibility Study for the St. Louis North County Site.